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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/696,335

10/28/2003

Isaac Farr

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EXAMINER

BALDWIN, GORDON

ART UNIT

PAPER NUMBER

1775

MAIL DATE

DELIVERY MODE

08/23/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/696,335

Applicant(s)

FARR ET AL.

Examiner

Gordon R. Baldwin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 June 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 49-55, 63-71, 73, 75, 77 and 79-85 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 52, 82 and 83 is/are allowed.
- 6) ☒ Claim(s) 49-51, 53-55, 63-71, 73, 75, 77, 79-81, 84 and 85 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 49 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. As for the section of claim 49 stating that, "a single source of calcium phosphate which, upon being exposed to a solubilizing binder dissolves and precipitates to form reprecipitated calcium phosphate, a reaction retardant, a layered double hydroxide, a polyacid and a accelerant" it is not understood what is being produced by the combination of the binder and the calcium phosphate. The way that the claim is written, it seems as though the combination of the binder and the calcium phosphate would make a reprecipitated calcium phosphate, a reaction retardant, a layered double hydroxide, a polyacid and a accelerant individually, which is not considered to be possible by merely combining a binder and a calcium phosphate.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 69 and 70 are rejected under 35 U.S.C. 102(b) as being anticipated by Bredt (Pub. No. 20050197431 A1).

Consider claim 69, Bredt discloses the use of a three-dimensional printing technique that that applies multiple layers, that can be ceramic, to make the three-dimensional form. (Para. 0004 and 0013) A reaction retardant of sodium phosphate is used (Para. 0065) as well as the particulate, calcium phosphate (Para. 0070).

As for the section concerning the particulate blend being a particulate blend including a single source of calcium phosphate, a reaction retardant, a layered double hydroxide, a polyacid and a reaction accelerant a solubilizing binder introduced into said particulate blend to dissolve calcium phosphate to dissolve calcium phosphate of said single source of calcium phosphate and reprecipitated calcium phosphate formed from the dissolved calcium phosphate”, it is considered to be a product-by-process and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production: If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.”, (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious different between the claimed product and the

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prior art product (*In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Consider claim 70, Bredt teaches the use of a humectant in the binder. (Para. 0068)

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 49, 51, 53-55, 63-68, 72, 74-81 and 84-85 are rejected under 35

U.S.C. 103(a) as being unpatentable over Bredt (Pub. No. 20050197431 A1), and further in view of Nichols (Pat. No. 5,952,093).

Consider claim 49 and 65, Bredt discloses the use of a three-dimensional printing technique that that applies multiple layers, that can be ceramic, to make the three-dimensional form. (Para. 0004 and 0013) A reaction retardant of sodium phosphate is used (Para. 0065) as well as the particulate, calcium phosphate (Para. 0070).

However, Bredt does not teach the use of a layered double hydroxide (LDH) but Nichols teaches the use of LDH in the layering of materials (such as Mg Al-LDH in Col.

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5 lines 5-10) to make an inorganic layered material to be used as a reinforcing agent. (Col. 4 lines 65-68 and Col. 5 lines 5-10) It would have been obvious at the time of the invention to combine the layered three-dimensional structure and composition of Bredt with the use of LDH by Nichols to develop a composition that has a great resistance to heat and chemicals and enhanced stiffness. (Col. 2 lines 28-40)

As for the section concerning the particulate blend being hydrated by a "solubilizing binder and dissolves and precipitates to for reprecipitated calcium phosphate, a reaction retardant, a layered double hydroxide, a polyacid and a accelerant," it is considered to be a product-by-process limitation and even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.", (*In re Thorpe*, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (*In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Consider claim 51, Bredt teaches a solution that can be applied by the use of an ink-jet print head (Para. 0013) and an aqueous solution that uses wetting agents (Para. 0089) and Humectants (0081) and flow rate enhancers which are considered to be surfactants since they increase the wetting characteristics of the fluid (Para. 0083).

Consider claim 53, Bredt discloses the claimed invention except for the pre-ceramic having a compression modulus of 0.05 Giga-Pascal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a pre-ceramic having a compression modulus of 0.05 Giga-Pascal, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Consider claim 54, Bredt teaches that the ceramic binder can be fused during a heat treatment to form a ceramic. (Para. 0069)

Consider claim 55, Bredt discloses the claimed invention except for the pre-ceramic having a compression modulus of 0.14 Giga-Pascal. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a pre-ceramic having a compression modulus of 0.14 Giga-Pascal, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

Consider claim 63, the Bredt reference teaches the use of sodium phosphate (Para. 0065) in addition to the use of a citric acid (malic acid) (Para. 0017). However, these sections may not mention the use of a pH modifying blend, but Bredt does teach that pH "buffers" can be used in paragraph 88. Therefore, the

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teaching of sodium phosphate or a citric acid, as well as the contemplation of the use of pH buffers is considered to read upon the claimed invention. This is especially evident since Brecht specifically says, "Other solution parameters such as pH and salt concentrations may be used to modify flow properties. Added salts tend to lower the viscosity of binders that include...sodium phosphate." This statement is considered to use sodium phosphate to adjust pH and salt concentrations in the binder. (Para. 65)

Consider claims 64 and 84, Brecht teaches the use of a pH modifier to prevent the particular from solidifying. Para. 68

Consider claim 66, Brecht teaches the use of fillers, which is considered to be an accelerant, because the filler particles provide mechanical structure to the hardening composition which become adhesively bonded together when the adhesive or binder dries and hardens after the activating fluid has been applied. (Para. 53 and 54)

Consider claim 67, Brecht teaches the use of a pH modifier to prevent the particular from solidifying. Para. 68 Additionally, the Brecht reference teaches the use of sodium phosphate (Para. 0065) in addition to the use of a citric acid (malic acid) (Para. 0017). However, these sections may not mention the use of a pH modifying blend, but Brecht does teach that pH "buffers" can be used in paragraph 88. Therefore, the teaching of sodium phosphate or a citric acid, as well as the contemplation of the use of pH buffers is considered to read upon the claimed invention. This is especially evident since Brecht specifically says, "Other solution parameters such as pH and salt concentrations may be used to modify flow properties. Added salts tend to lower the

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viscosity of binders that include...sodium phosphate.” This statement is considered to use sodium phosphate to adjust pH and salt concentrations in the binder. (Para. 65)

Consider claim 68, this claim does not further limit the composition except for stating a process by which a particulate blend is to be applied to form an object and “[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.”, (In re Thorpe, 227 USPQ 964,966). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product (*In re Marosi*, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir. 1983), MPEP 2113).

Consider claim 75, Nichols teaches the use of polyacrylic acid in the invention, which the applicant considers to be a polyacid. (Col. 6 lines 30-37)

Consider claim 77, Bredt teaches the use of sodium phosphate (para. 0065) in addition to the use of a citric acid (Para. 0017)

Consider claims, 79 and 81, Nichols teaches the use of a layer double hydroxides including MgAl-LDH. (Col. 5 lines 5-10)

Consider claim 80, Nichols teaches the use of a carbonate in with the layered double hydroxide. (Col. 5 lines 5-10)

Consider claim 85, Bredt discloses the claimed invention except for the specific use of the pH modifiers in claim 85, it would have been obvious to one having ordinary skill in the art at the time the invention was made to one of the pH modifiers of claim 85, since it has been held to be within the general skill of a worker in the art to select known material on the basis of its suitability for the intended use as a matter of obvious engineering choice. In re Leshin, 125 USPQ 416

Claim 50 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bredt (Pub. No. 20050197431 A1), Nichols (U.S. Pat. No. 5,952,093) and further in view of Kelly, (U.S. Pat. No. 5,676,745)

Consider claim 50, Bredt teaches the use of calcium phosphate but does not specifically use the term hydroxyapatite while Nichols teaches the use of LDH in the layering of materials to make an inorganic layered material to be used as a reinforcing agent. (Col. 4 lines 65-68 and Col. 5 lines 5-10) but neither specifically teaches the making of three-dimensional ceramic objects with calcium hydroxyapatite and a binder. However, Kelly teaches the making of three-dimensional ceramic objects with calcium hydroxyapatite and a binder. (Col. 8, lines 5-15) It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the calcium

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phosphate with a binder of the Bredt with Nichols use of LDH in the layering materials with the use of calcium hydroxyapatite and a binder of the Kelly reference, to make a simplified lower cost, low temperature method of fabricating ceramic materials. (Kelly, Col. 1 lines 40-45)

Additionally, Bredt teaches the use of calcium phosphate but does not specifically use the term hydroxyapatite, but hydroxyapatite is considered to be a member of the family of calcium phosphates. Additionally, since Bredt discloses the claimed invention except for the specific use of the term hydroxyapatite, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use hydroxyapatite, since it has been held to be within the general skill of a worker in the art to select known material on the basis of its suitability for the intended use as a matter of obvious engineering choice. In re Leshin, 125 USPQ 416

Claim 71 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bredt (Pub. No. 20050197431 A1) in further view of Kelly, (U.S. Pat. No. 5,676,745)

Consider claim 71, Bredt teaches the use of calcium phosphate but does not specifically use the term hydroxyapatite, however Kelly teaches the making of three-dimensional ceramic objects with calcium hydroxyapatite and a binder. (Col. 8, lines 5-15) It would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the calcium phosphate with a binder of the Bredt reference with use of calcium hydroxyapatite and a binder of the Kelly reference, to make a simplified

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lower cost, low temperature method of fabricating ceramic materials. (Col. 1 lines 40-45)

Additionally, Bredt teaches the use of calcium phosphate but does not specifically use the term hydroxyapatite, but hydroxyapatite is considered to be a member of the family of calcium phosphates. Additionally, since Bredt discloses the claimed invention except for the specific use of the term hydroxyapatite, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use hydroxyapatite, since it has been held to be within the general skill of a worker in the art to select known material on the basis of its suitability for the intended use as a matter of obvious engineering choice. In re Leshin, 125 USPQ 416

Claims 66 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bredt (Pub. No. 20050197431 A1), Nichols (Pat. No. 5,952,093) and further in view of Goodson (Pub. No. 2002/0009622 A1).

Bredt discloses the use of a three-dimensional printing technique that that applies multiple layers, that can be ceramic, to make the three-dimensional form. (Para. 0004 and 0013) and Nichols teaches the use of LDH in the layering of materials to make an inorganic layered material to be used as a reinforcing agent. (Col. 4 lines 65-68 and Col. 5 lines 5-10) However, neither of them teaches the specific use of the accelerants lithium phosphate, aluminum nitrate or iron nitrate. Goodson teaches a phosphate cement coating (which contains calcium phosphate (Para. 0006)) that uses accelerants (abstract), specifically aluminum nitrate (Para 0079). Therefore it would have been obvious to a person of ordinary skill in the art at the time of the invention to

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combine Bredt and Nichols with Goodson so as to provide a three dimensional printing technique with layered double hydroxides that uses an accelerant such as aluminum nitrate to provide instant densification of the phosphate cement through an exothermic reaction brought on by the introduction of the aluminum nitrate. (Goodson Para. 0079)

Allowable Subject Matter

Claim 52, 82 and 83 are allowed.

Response to Arguments

Applicant's arguments filed 6/5/2007 have been fully considered but they are not persuasive. In regard to the arguments against the claim rejections of 35 U.S.C. 102(b) with Bredt and the 35 U.S.C. 103(a) rejection with Bredt, Nichols, Kelly and Goodson, the production and additives involved to form the reprecipitated calcium phosphate still fall into the realm of being product-by-process limitations and since these are article claims, this portion of the claims is not given patentable weight. As for the recitation of a reprecipitated calcium phosphate, since it is made of the same materials and has the same material make up of regular calcium phosphate, the lack of a claimed structural difference in the claims does not structurally differentiate between the prior art and the applicant's claims. While the applicant has stated in the remarks section that the crystals grow and become entangled, this aspect is missing from the claims, thereby not

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making the calcium phosphate of the prior art reference different from the claimed invention.

As for the applicant's reaction retardants, the Bredt reference teaches the use of sodium phosphate (Para. 0065) in addition to the use of a citric acid (malic acid) (Para. 0017). However, these sections may not mention the use of a pH modifying blend, but Bredt does teach that pH "buffers" can be used in paragraph 88. Therefore, the teaching of sodium phosphate or a citric acid, as well as the contemplation of the use of pH buffers is considered to read upon the claimed invention. This is especially evident since Bredt specifically says, "Other solution parameters such as pH and salt concentrations may be used to modify flow properties. Added salts tend to lower the viscosity of binders that include...sodium phosphate." This statement is considered to use sodium phosphate to adjust pH and salt concentrations in the binder. (Para. 65)

As for Bredt lacking an accelerant, since this is only mentioned in claim 69, as part of a product-by process limitation (as stated above) it is not accorded patentable weight in addition to it being part of an intermediate composition rather than the final product. Therefore, the arguments against the use of Bredt are not persuasive.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

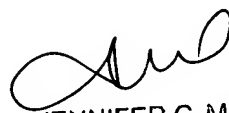
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon R. Baldwin whose telephone number is (571)272-5166. The examiner can normally be reached on M-F 7:45-5:15.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GRB


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SUPERVISORY PATENT EXAMINER
8/17/14